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RECORD OF REVISIONS

Rev	Date	Description	POC	OIC
0	8/16/04	Initial issue.	Kelly Bingham, <i>FWO-DECS</i>	Gurinder Grewal, <i>FWO-DO</i>

Responsible Engineering Standards POC and Committee
for upkeep, interpretation, and variance issues

WTS 4-01	Welding POC/Committee
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WTS 4-01 WELDING TECHNIQUE SHEET APPLICATION

1.0 PURPOSE AND SCOPE

- A. The purpose of this procedure is to establish the requirements for developing, processing, and application of Welding Technique Sheets (WTS) for use in special welding or brazing applications at LANL.
- B. The scope of this section is special welding applications under the LANL Welding Program requiring close process control.

2.0 REFERENCES

- 1. WFP 2-01, *Welding Fabrication Procedure*
- 2. WPS 3-01, *Application of Welding Procedure Specifications*

3.0 ACRONYMS AND DEFINITIONS

- A. **Welding Technique Sheet** – a document used to restrict or define variable ranges of a given Welding Procedure Specification (WPS) or Welding Fabrication Procedure (WFP; reference WFP 2-01, *Welding Fabrication Procedure*) for use in special applications or unusual conditions.

4.0 GENERAL

4.1 Responsibilities

- A. The **LANL Welding Program Administrator (WPA)** is responsible for preparing and approving Welding Technique Sheets, as requested from supervision, for special welding or brazing applications. Special applications are defined in paragraph 5.A below.
- B. The assigned **LANL or SSS Welding Inspector** (CWI or WPA-qualified equivalent) is responsible for monitoring welding performed in accordance with the approved WTS. Any noted deviations from the WTS shall be recorded by the Welding Inspector and immediately reported to the LANL or Craft Supervisor for resolution. Deviations to essential variables shall not be permitted until the LANL Welding Program Administrator revises the WTS.
- C. The LANL or SSS **Welder Supervisor** and the assigned **Welder** are responsible for the application of and conformance to the approved WTS. In cases where the assigned WTS cannot or is not being followed, the LANL or Craft Supervisor is responsible for immediately terminating the welding operation and notifying the Welding Inspector. Violation of essential variables will be reported to the WPA or QA for resolution.

5.0 PROCEDURE

- A. Welding Technique Sheets (WTS) may be requested by any SSS, subcontractor, project, or program performing a welding operation that is considered of a nature that may require additional control of variables other than those defined in the WPS (Reference WFP 2-01, *Welding Fabrication Procedure*). This may include, but not necessarily be limited to, the following conditions:
 - 1. Welding of high strength low alloy steels where joule heat input is critical to control low temperature notch toughness (Charpy, DT, etc.)
 - 2. Materials that require special pre- or post- weld heat treating (PWHT) procedures
 - 3. Vacuum or pressure boundary welding where the rootpass or final NDE includes radiographic or ultrasonic testing
 - 4. Special welding techniques, processes, or sequences to control stresses or distortion
 - 5. Special conditions in pipe or tubing, or positions / limited access that require precise control over the welding parameters
 - 6. Fully automatic welding when workmanship samples are required to qualify the welding or the operator
- B. Written requests (electronic submittals preferred) for a WTS shall be directed to the LANL WPA for processing. The LANL WPA shall develop a WTS upon review of a request that meets conditions such as those described in the paragraph above.
- C. If the conditions of the request warrant, the LANL WPA will review the applicable welding procedure specification (WPS) and determine the extent of additional controls required.
- D. Upon completion of the initial review, the LANL WPA will draft a WTS for review by the requesting department or individual. A Welding Technique Sheet (WTS), Attachment 1, shall be developed and electronically filed. Welding parameters of the WTS shall be supported by a qualified Welding Procedure Qualification Record (PQR). When required, new or additional PQRs shall be developed in accordance with GWS 1-04, *Welding Procedure Qualification Tests and Records*, of this program.
- E. If the conditions of the WTS satisfy the control requirements for the part or assembly being welded, the WTS shall be signed by the LANL WPA and distributed in accordance with the following paragraph. The original WTS shall be retained by the requester with copies (for reference purposes) available in Chapter 13, Volume 4 of the LANL Engineering Standards Manual.
- F. Welding Technique Sheets will be issued to the requesting department or individual. Upon completion of welding as described in the WTS, the WTS shall be filed for record purposes by the department or individual.
- G. A WTS developed and issued for a specific set of conditions on one job shall not be used on another job unless reviewed by the LANL WPA and re-issued or otherwise authorized for the new application.

6.0 ATTACHMENTS

Attachment 1: Welding Technique Sheet Form